

● PRINTER RUSH ●
(PTO ASSISTANCE)

Application :	Examiner :	GAU :
10/70, 357	Ghyka	2812
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DOC CODE	DOC DATE	MISCELLANEOUS
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<input type="checkbox"/> SRFW		<input type="checkbox"/> Other
<input type="checkbox"/> DRW		
<input type="checkbox"/> OATH		
<input type="checkbox"/> 312		
<input checked="" type="checkbox"/> SPEC	10-31-05	

[RUSH] MESSAGE: 1st line of page 1, some text are covered by stamp. Data is illegible.

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MR

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Name, ARMANDO GOMEZ
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THERMAL TREATMENT EQUIPMENT AND METHOD FOR
HEAT-TREATING

BACKGROUND OF THE INVENTION

5 The present invention relates to a method for ~~heating and annealing thermal~~
treatment equipment applying the method. Particularly, the invention relates to the
thermal treatment equipment heating a substrate or a formed matter on the substrate
by heated gas and the method for heat-treating using the equipment.

In a manufacturing process of a semiconductor device, thermal treatments
10 aiming at oxidation, diffusion, gettering, and recrystallization after ion injection
with respect to a semiconductor or a semiconductor substrate are programmed. A
typical example of the equipment performing these thermal treatments is a hot wall
type annealing furnace of horizontal type or vertical type, which is used widely.

The annealing furnace of horizontal type or vertical type is batch type
15 equipment treating many substrates in a lump. For example, the vertical annealing
furnace mounts a substrate on a susceptor formed by quartz horizontally and in
parallel, and performs putting in and out to a reaction pipe by an elevator driving up
and down. At outer circumference portion of a bell-jar type reaction pipe, a heater is
provided so as to heat a substrate by the heater. It takes comparatively long time for
20 rising time reaching the predetermined heating temperature and falling time cooling
to temperature possible to take out because of the construction thereof.

Incidentally, in MOS transistor used for an integrated circuit, very high
process accuracy is required as elements become fine. Especially, it needs to diffuse
impurity at the minimum for forming thin junction. However, process taking long
25 time for rising temperature and falling temperature as the annealing furnace makes
forming thin junction difficult.

Rapid thermal anneal (described RTA hereafter) method is developed as
thermal treatment technique performing rapid heating and rapid cooling. An RTA
equipment heats a substrate or a formed matter on the substrate rapidly using
30 infrared ray lamp so as to perform thermal treatment in short time.

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heating and a thermal